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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/159,442	09/24/1998	ELWOOD G. NORRIS	T7029	5130
20444	7590	07/01/2005	EXAMINER	
VAUGHN W NORTH THORPE NORTH WESTERN P O BOX 1219 SANDY, UT 840911219			LEE, PING	
			ART UNIT	PAPER NUMBER
			2644	

DATE MAILED: 07/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/159,442

Applicant(s)

NORRIS ET AL.

Examiner

Ping Lee

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 28 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It appears that claims 28 and 29 should depend on claim 20 not claim 22.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 5, 20 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al (US 4,823,908).

Regarding claims 1 and 5, Tanaka et al (hereafter Tanaka) disclose a method for generating parametric audio output based on interaction of multiple ultrasonic frequencies within air as a nonlinear medium, said method comprising the steps of:

a) generating an electronic signal comprising at least two ultrasonic signals having a difference in value which falls within an audio frequency range (col. 2, lines 32-43);

b) transferring the electronic signal to an electro acoustical transducer diaphragm (40 as specified on line 3 of col. 7; a piezoelectric vibrator inherently includes a diaphragm) which couples directly with the air as part of a single stage energy conversion process;

c) converting the electronic signal at the diaphragm directly to mechanical displacement (vibrations) as a driver member of a parametric speaker; and

d) mechanically emitting the at least two ultrasonic signals from the diaphragm into the air as ultrasonic compression waves which interact within the air to generate the parametric audio output (additional explanation in col. 2, lines 63-66).

Regarding claims 20 and 23, Tanaka further shows the support structure (12,13).

5. Claims 1, 5, 20, 23 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Taniishi (US 5,357,578).

Regarding claims 1, 5 and 27, Taniishi disclose a method for generating parametric audio output based on interaction of multiple ultrasonic frequencies (col. 3, lines 42-43) within air as a nonlinear medium, said method comprising the steps of:

a) generating an electronic signal comprising at least two ultrasonic signals having a difference in value which falls within an audio frequency range (col. 2, lines 35-51; col. 3);

b) transferring the electronic signal to an electro acoustical transducer diaphragm (10) which couples directly with the air as part of a single stage energy conversion process;

c) converting the electronic signal at the diaphragm directly to mechanical displacement (vibrations) as a driver member of a parametric speaker; and

d) mechanically emitting the at least two ultrasonic signals from the diaphragm into the air as ultrasonic compression waves which interact within the air (the gel has air) to generate the parametric audio output (additional explanation in col. 3, lines 40-42).

Regarding claims 20 and 23, Taniishi further shows the support structure (display as shown in Fig. 6)

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 2, 4, 7, 12, 13, 21, 24 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Schindel et al (US 5,287,331).

Regarding claims 2, 7 and 21, Tanaka fails to explicitly show an electrostatic transducer. Tanaka teaches an ultrasonic generator using a piezoelectric vibrator without specifying the particular structure. One skilled in the art would have expected that any specify design of the ultrasonic transducer could be used without generating any unexpected result. Schindel et al (hereafter Schindel) teaches how to use a piezoelectric film (col. 3, lines 67-68) electrostatic transducer with a backplate (1) for generating ultrasonic signals. Thus, it would have been obvious to one of ordinary skill

in the art to modify Tanaka in view of Schindel by using the piezoelectric film electrostatic transducer in order to generate the ultrasonic signals.

Regarding claims 4 and 24, Schindel teaches the thermal formed electro mechanical film diaphragm (col. 4, line 1).

Regarding claims 12 and 13, Schindel fails to show the dimension of the diaphragm is related to the wavelength of the lowest ultrasonic frequency. It was well known in the art that the frequency of a signal is inversely related to its wavelength. Therefore, it would have been obvious to one of ordinary skill in the art to select a diaphragm dimension greater than the lowest ultrasonic frequency or ten times greater than the lowest ultrasonic frequency to ensure that the lowest ultrasonic frequency would be produced properly.

Regarding claim 26 and 28, Schindel suggests the plastic film diaphragm (col. 3, line 66).

Regarding claim 27 and 29, although Schindel and Tanaka respectively fail to show diaphragm used PVDF, PVDF was a well known material for making piezoelectric film.

8. Claims 3, 6, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Sprenkels et al (US 4,908,805).

Regarding claims 3, 6, 22 and 25, Tanaka fails to explicitly show an electret transducer. Tanaka teaches an ultrasonic generator using a piezoelectric vibrator without specifying the particular structure. One skilled in the art would have expected that any specify design of the ultrasonic transducer could be used without generating

any unexpected result. Sprenkels et al (hereafter Sprenkels) teaches how to use an electret transducer for generating ultrasonic signals. Thus, it would have been obvious to one of ordinary skill in the art to modify Tanaka in view of Sprenkels by using the electret transducer in order to generate the ultrasonic signals.

9. Claims 4, 8, 9, 10, 11, 15, 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Tibbetts et al (US 4,056,742).

Regarding claims 4, 8, 9, 10, 11, 15 and 16, Tanaka fails to show thermally formed film diaphragm transducer. Tanaka teaches an ultrasonic generator using a piezoelectric vibrator without specifying the particular structure. One skilled in the art would have expected that any specify design of the ultrasonic transducer could be used without generating any unexpected result. Tibbetts et al (hereafter Tibbetts) teaches how to use a piezoelectric film (col. 3, lines 67-68) transducer with a backplate (1) for generating ultrasonic signals. As shown in the drawings, Tibbetts suggested the curvature for both the film and the backplate. Although Tibbetts fails to show that the film is thermally formed, it was well known in the art to use heat to alter the shape of the film. Thus, it would have been obvious to one of ordinary skill in the art to modify Tanaka in view of Tibbetts by using the piezoelectric film transducer in order to generate the ultrasonic signals.

Regarding claim 18, although Tibbetts fails to explicitly show the distance between peak to trough is one-half wavelength, this is an inherent feature to ensure that the piezo film to operate properly.

Regarding claim 19, Tibbetts' diaphragm has concave dimples (s2, s4, s6) in closely spaced, side by side array.

10. Claims 4 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Sakagami et al (US 4,784,915).

Regarding claims 4 and 17, Tanaka fails to show thermally formed film diaphragm transducer. Tanaka teaches an ultrasonic generator using a piezoelectric vibrator without specifying the particular structure. One skilled in the art would have expected that any specify design of the ultrasonic transducer could be used without generating any unexpected result. Sakagami et al (hereafter Sakagami) teaches how to use a piezoelectric film (col. 6, lines 27-35) transducer with a backplate (2) for generating ultrasonic signals. As shown in col. 6, Sakagami suggested that the spacing between the piezo film and the backplate is quarter wavelength. Thus, it would have been obvious to one of ordinary skill in the art to modify Tanaka in view of Sakagami by using the piezoelectric film transducer in order to generate the ultrasonic signals.

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1 and 20 are rejected under the judicially created doctrine of double patenting over claim 1 of U. S. Patent No. 5,889,870, claim 1 or 3 of U. S. Patent No. 6,606,389, claim 1 of U. S. Patent No. 6,466,674, claim 1 of U. S. Patent No. 6,359,990, claim 1 of U. S. Patent No. 6,108,427, claim 1 of U. S. Patent No. 5,885,129, claim 1 of U. S. Patent No. 5,859,915 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: claims 1 and 20 of the instant application specifying how to generate a parametric audio output using ultrasonic generator which has been claimed in claim 1 of patent '870, patent '674, patent '427, patent '129, patent '915 and patent '990, and claim 1 or 3 of patent '389. The ultrasonic emitter specified in claim 1 of patent '870, patent '427, patent 915 or patent '674 inherently includes a diaphragm.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

13. Claims 1, 3, 6, 20, 22 and 25 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent

No. 6,151,398, claim 1 of U.S. Patent No. 6,108,433, claim 1 or 27 of U.S. Patent No. 6,850,623 in view of Taniishi.

Claim 1 of patent '398 and patent '433 specifies an ultrasonic emitter device using a diaphragm without specifying how to generate the ultrasonic frequencies. Claim 1 or 27 of patent '623 specifies a parametric loudspeaker. Taniishi teaches how to perform audio heterodyning using ultrasonic frequencies. Thus, it would have been obvious to one of ordinary skill in the art to modify patent '398 in view of Taniishi by incorporating the process and the circuit element for performing the heterodyning in order to use the ultrasonic emitter of patent '398 for generating parametric audio output signal.

14. Claims 1 and 20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,299,899 in view of Taniishi.

Claim 1 of patent '899 specifies generating audio signal using a parametric speaker without specifying how to generate the ultrasonic frequencies. Taniishi teaches how to perform audio heterodyning using ultrasonic frequencies. Thus, it would have been obvious to one of ordinary skill in the art to modify patent '899 in view of Taniishi by incorporating the process and the circuit element for performing the heterodyning in order to use the ultrasonic emitter of patent '398 for generating parametric audio output signal.

15. Claims 1, 2, 20 and 21 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 15 or 16 of U.S. Patent No. 6,304,662 in view of Taniishi.

Claim 15 or 16 of patent '662 specifies an ultrasonic speaker device using a diaphragm without specifying how to generate the ultrasonic frequencies for the diaphragm. Taniishi teaches how to perform audio heterodyning using ultrasonic frequencies. Thus, it would have been obvious to one of ordinary skill in the art to modify patent '662 in view of Taniishi by incorporating the process and the circuit element for performing the heterodyning in order to use the ultrasonic emitter of patent '398 for generating parametric audio output signal.

16. Claims 1, 2, 7, 20 and 21 are rejected under the judicially created doctrine of double patenting over claim 1 of U. S. Patent No. 6,044,160 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: the claimed diaphragm reads on "diaphragm" as specified in patent '160 and the claimed process of generating at least two ultrasonic signals for generating the parametric audio output is covered by the preamble and the modulating means of claim 1 of patent 160.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of

the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.


Response to Arguments

17. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 571-272-7522. The examiner can normally be reached on Monday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian C. Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ping Lee
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